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HKT100***U/HKT100Y01U

μ-Chip (RFID)

REJ03P0006-0101
Rev.1.01
Feb 23, 2007

Overview

- HKT100***U/HKT100Y01U is RFID (Radio Frequency Identification) for 2.45 GHz.
- It has a unique ID inside, then it is applicable for management of individual object.

Note: "***" or "Y01" is a ROM code.

Feature

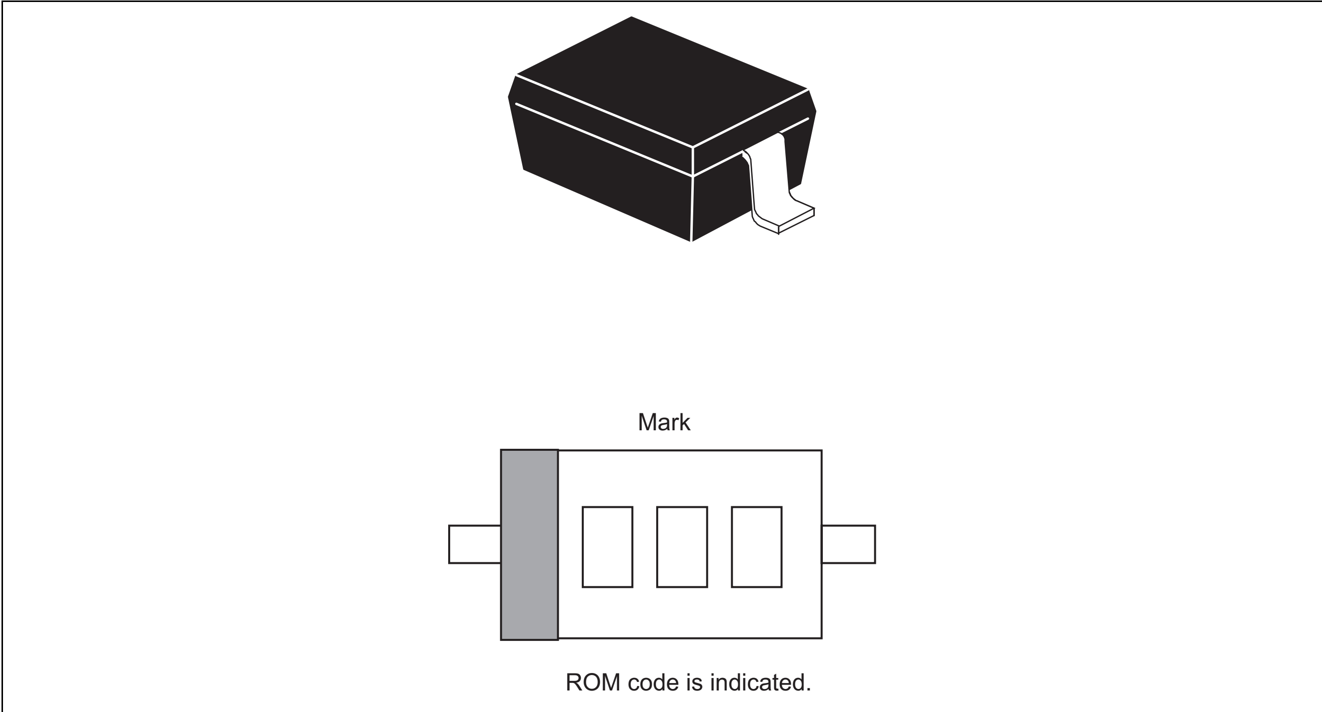
- Thin and small package: URP (PTSP0002ZA-A)
- Including unique μ-Chip ID which is not alterable
- Communication without contact

Note: "μ-Chip" and the μ-Chip Logo are either registered Trademarks or Trademarks of Hitachi,Ltd. in Japan and in other countries.

Order Part No.

Order Part No.	Unit of Packaging	Packing Form	Unit of Order	Note
HKT100***U	3,000	Taping	75,000	
HKT100Y01U	3,000	Taping	3,000	

Outline and Mark



Absolute Maximum Ratings

Item	Symbol	Specification			Unit	Condition	Remark
		Min	Typ	Max			
Storage temperature	Tstg	–30	—-	75	°C		
Ambient operation temperature	Ta	0	25	40	°C		No condensation
Received power	Pr	—	—	13.8	dBm		

Electrical Characteristics

Measurement conditions:
Unless otherwise specified, Ta = 25°C, fc = 2.416 ± 0.010 GHz, reader power = 150 mW
Single-patch antenna, linearity polarized waves, clock cycle =10 µs, clock duty cycle = 85%
Period of reading operations: 8 clock cycles, number of read bits: 128 bits
Product is measured under the condition that it is pressed onto the antenna shown in figure 1.
Please refer the preceding sheet.

Item	Specification			Unit	Condition	Remark
	Min	Typ	Max			
Communication distance	6.5	—	13	cm	Note4	Note1
µ-Chip ID Check	—	Passed	—	—	EDC Check	Note2, Note3

Notes:
1. The distance at which the read µ-Chip ID value matches the indicated value and the EDC check is passed.
2. Verification value calculated from the read µ-Chip ID value.
3. Detail data of µ-Chip ID is describe on the commodity specification.
4. Relation between the evaluation antenna and antenna positions;
   The planes of the gilded pattern for the evaluation antenna and the antenna itself should be parallel, the center of the evaluation antenna should be on the line that passes through the center of the antenna plane, and the gilded pattern's longer side should be within the antenna's plane of polarization.

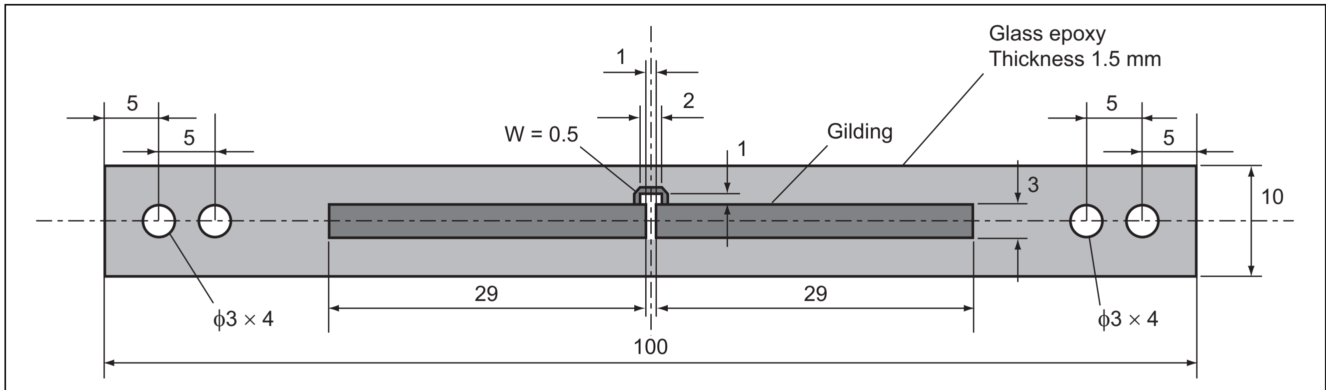


Figure 1 Evaluation Antenna

Reader Specifications and Type No.: MR-STD2

Item	Symbol	Specification	Unit	Remarks
Operation temperature	Ta	25	°C	
Carrier frequency	fc	2.416 ± 0.010	GHz	
Power	Pw	150	mW	
Clock cycle	Tclk	10	µs	
Clock duty ratio	duty	85	%	
Data read cycle	Tfm	8	Clock	
Data read bit count	Nb	128	Bits	

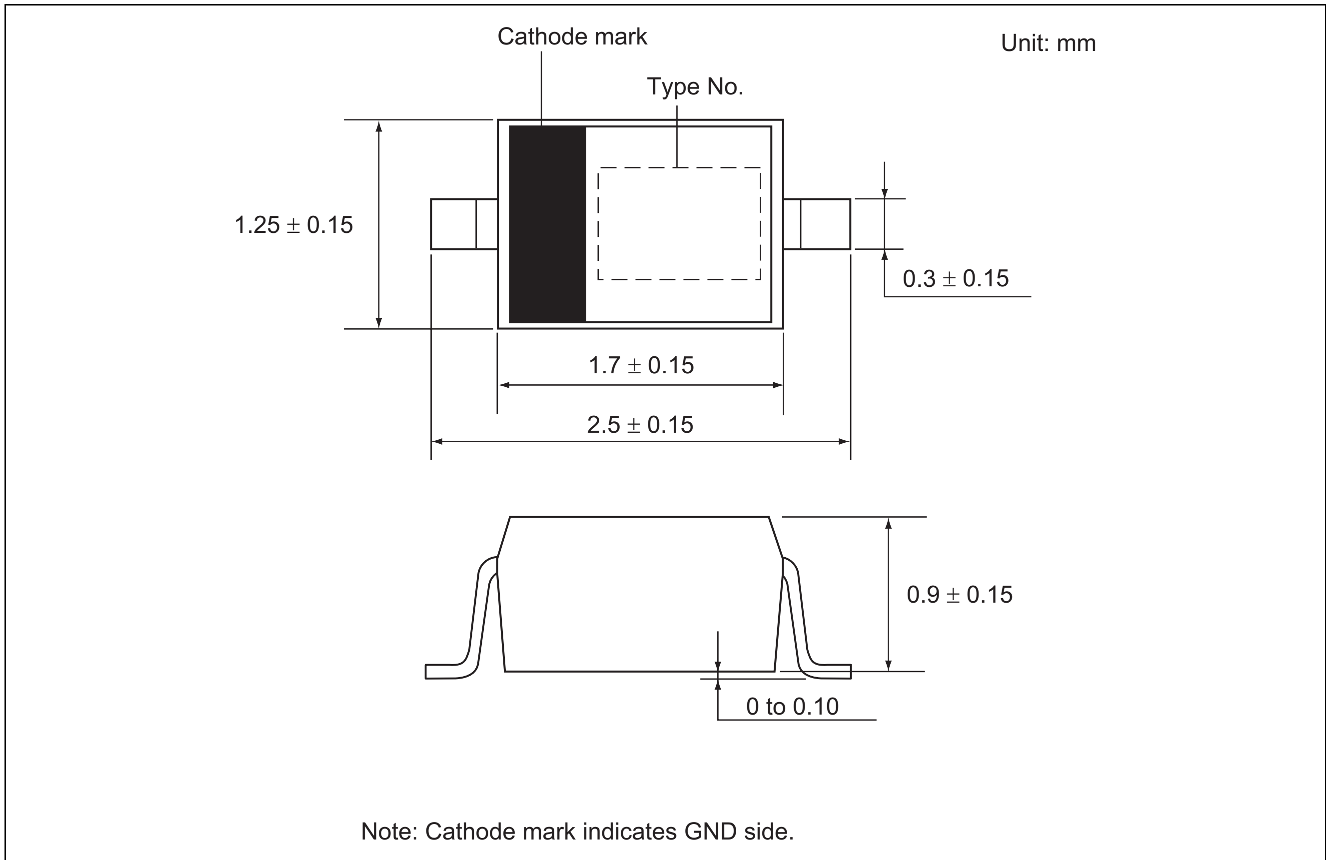
Cable Specifications

Item	Symbol	Specification	Unit	Remarks
Cable material	—	semi-rigid	—	
Total length of cable	L	20	cm	

Antenna Specifications and Type No.: PA1-2450AS

Item	Symbol	Specification	Unit	Remarks
Operation temperature	Ta	25	°C	
Polarization	—	Linear	—	
Number of patches	—	1	pcs	
Gain	—	7	dBi	

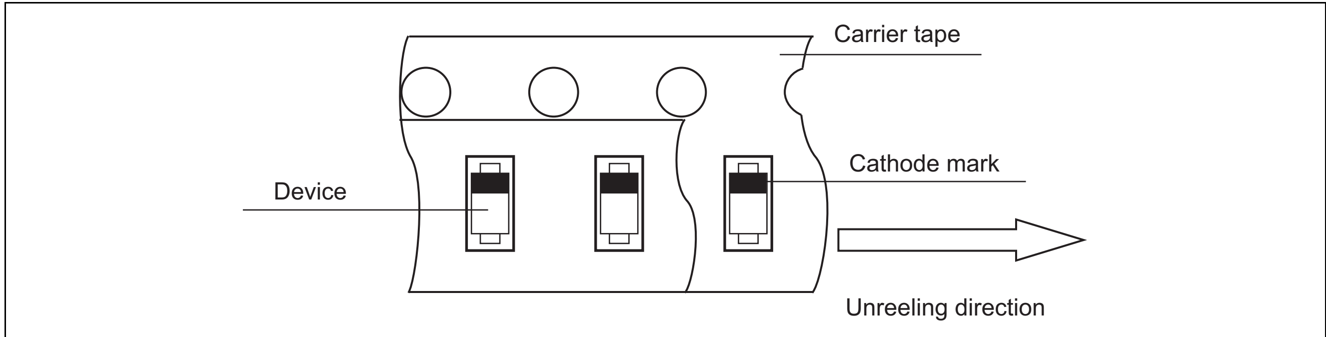
Dimension of Inlet Outline



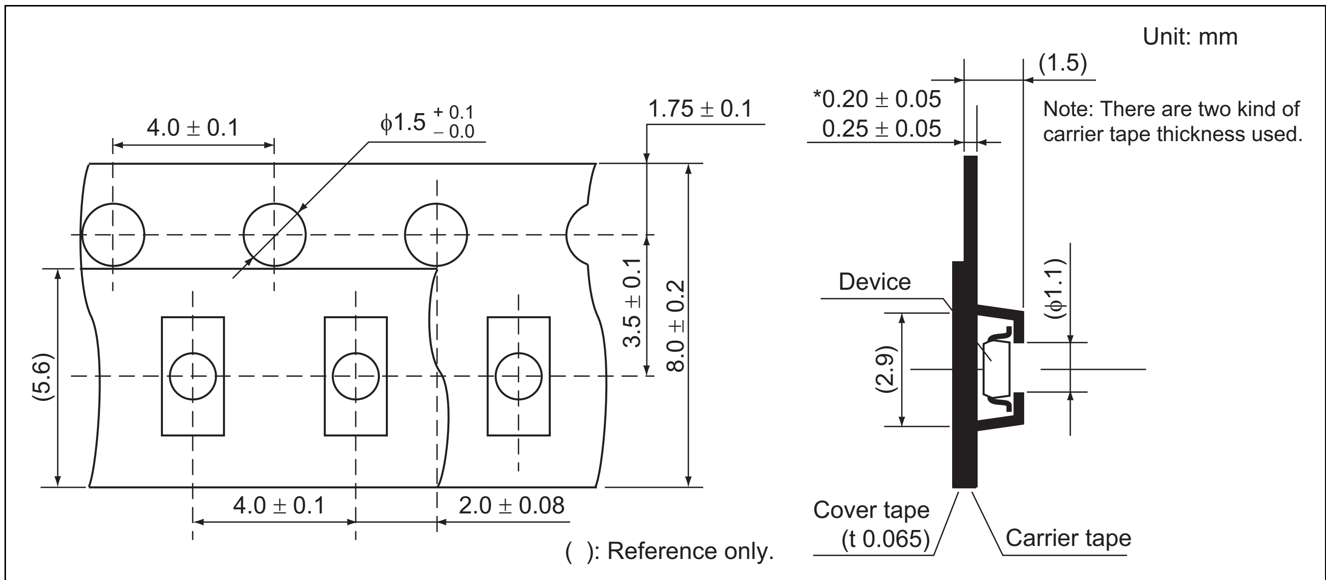
Packing Specifications

Taping Specification

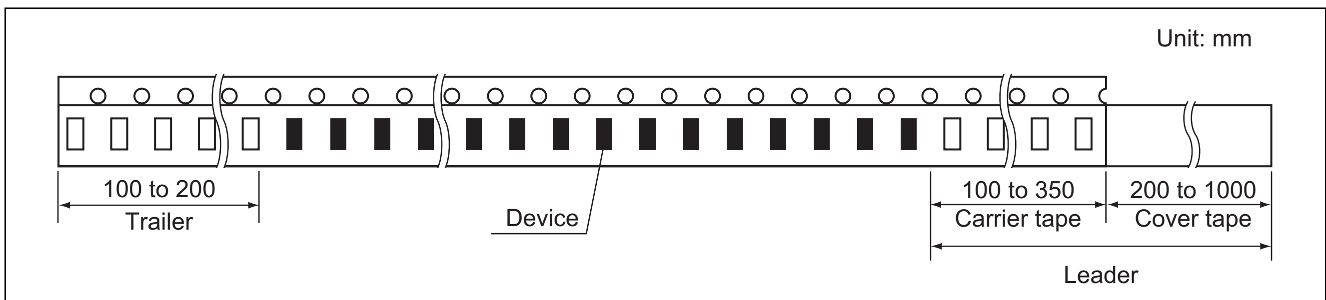
1. Direction of Device



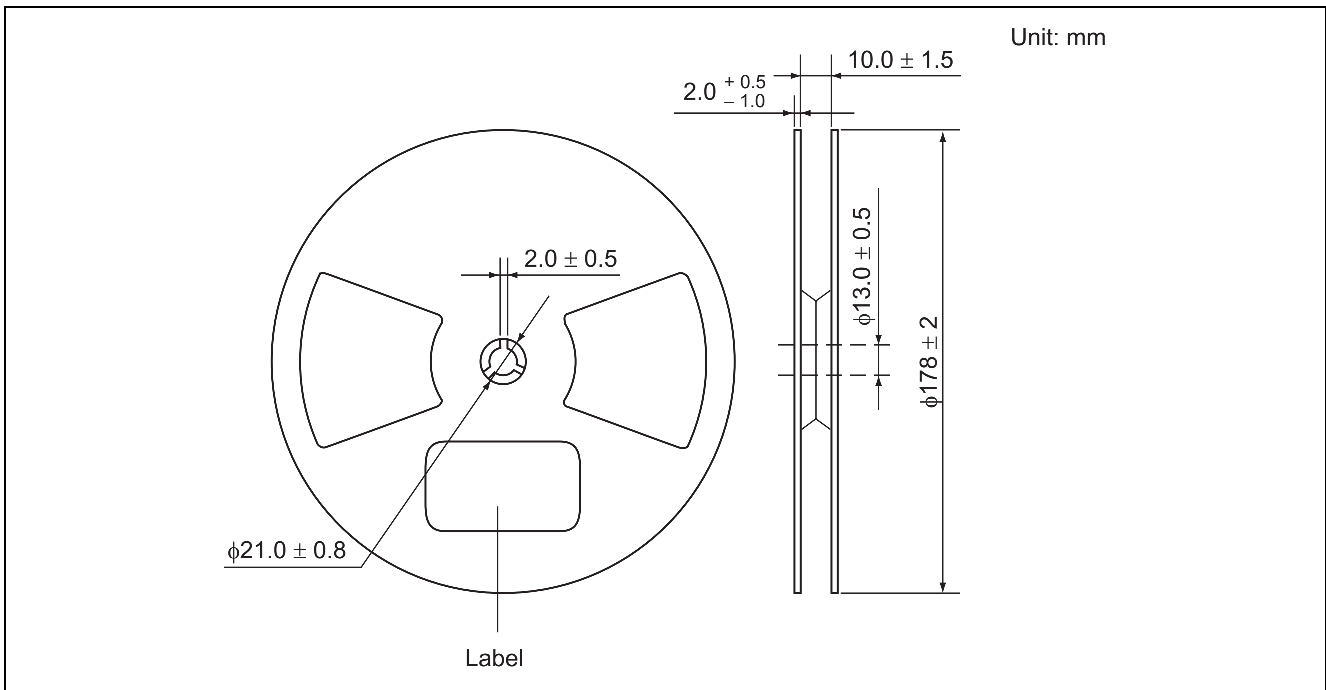
2. Taping Dimensions
   a. Carrier Tape and Cover Tape



   b. Leader and Trailer



c. Reel Dimensions



d. Example of Labeling

(For adapted lead free)

P/N: JAPAN (5)

(1) INT.C: HZU2.0BTRF-E

(2) W/C:3D4 LOT: EC40020-0H (4)

Pb-Free T.

(3) QTY:3000

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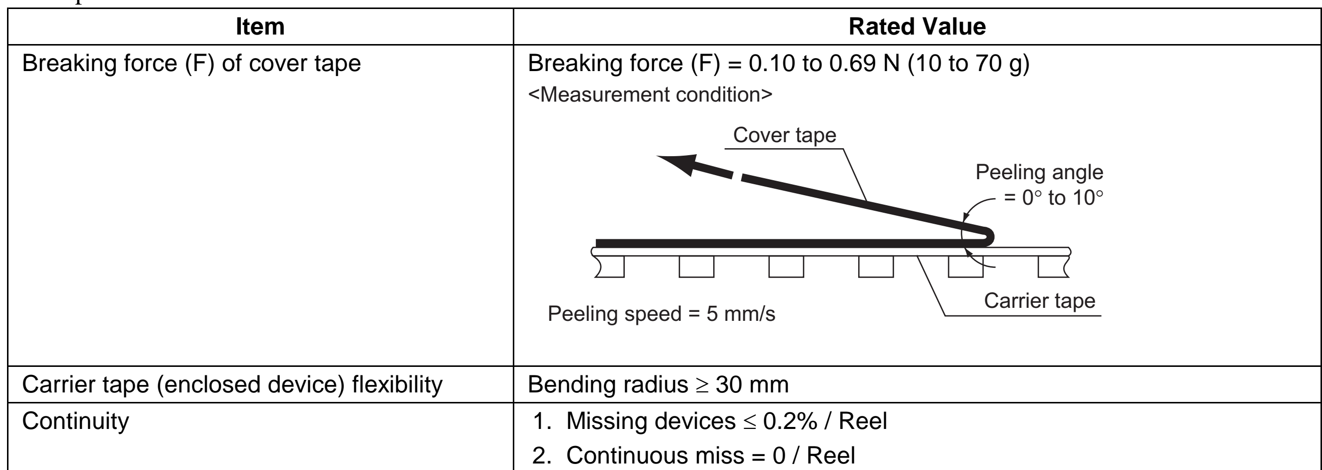
Notes:
1. Part No.
2. Management No. (Year, Month and Weekly code)
3. Quantity
4. Lot No.
5. Country of origin
   Japan → JAPAN
   Malaysia → MALAYSIA

3. Specifications



Item	Rated Value
Breaking force (F) of cover tape	Breaking force (F) = 0.10 to 0.69 N (10 to 70 g) <Measurement condition> Cover tape Peeling angle = 0° to 10° Carrier tape Peeling speed = 5 mm/s
Carrier tape (enclosed device) flexibility	Bending radius ≥ 30 mm
Continuity	1. Missing devices ≤ 0.2% / Reel 2. Continuous miss = 0 / Reel

4. Material

Item	Material
Carrier tape	Conductive plastics
Cover tape	Plastics
Reel	Polystyrene

5. Quantity of Devices

3,000 pieces/Reel

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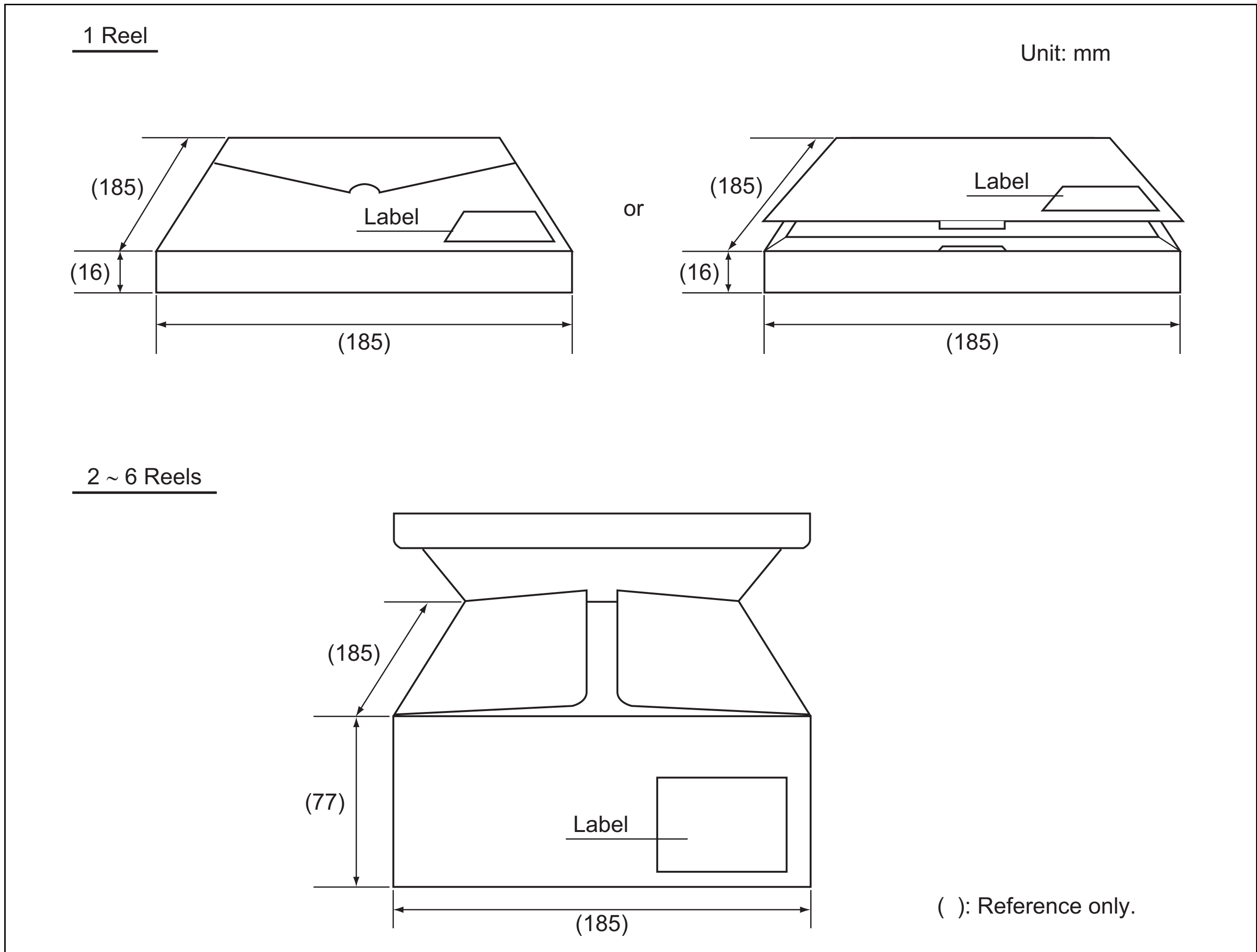
Inner Packing Box



Example of Labeling

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(1) PID 06100P10CV-001
(2) D/N RKZ6.8TKJR1
(3) QTY 8000
(4) SPN RKZ6.8TKJR1 ZZZZ
(5) WP MADE IN JAPAN T/C 6C2 FL90030E0 (7)
(6) AS MADE IN JAPAN S.LOT FL90030E0 (8)
(9) Pb-Free T.
(10) 2006/03/06

(1) Pack-ID
(2) Device Name
Note: Indicate "Q" the end of a device name only in the case of direct sale in Malaysia
(3) Quantity
(4) SAP Name
(5) Country of Wafer Process
(6) Country of Assembly
Japan → MADE IN JAPAN
Malaysia → MADE IN MALAYSIA
(7) Trace code
(8) Lot code
(9) Pb-Free indication (Only for Pb-free product)
(10) Date of Label issuance

Appearance

There should not be any scratch or/and dirt that affect characteristics.

Quality Level

(Compliant with the JIS Z 9015)

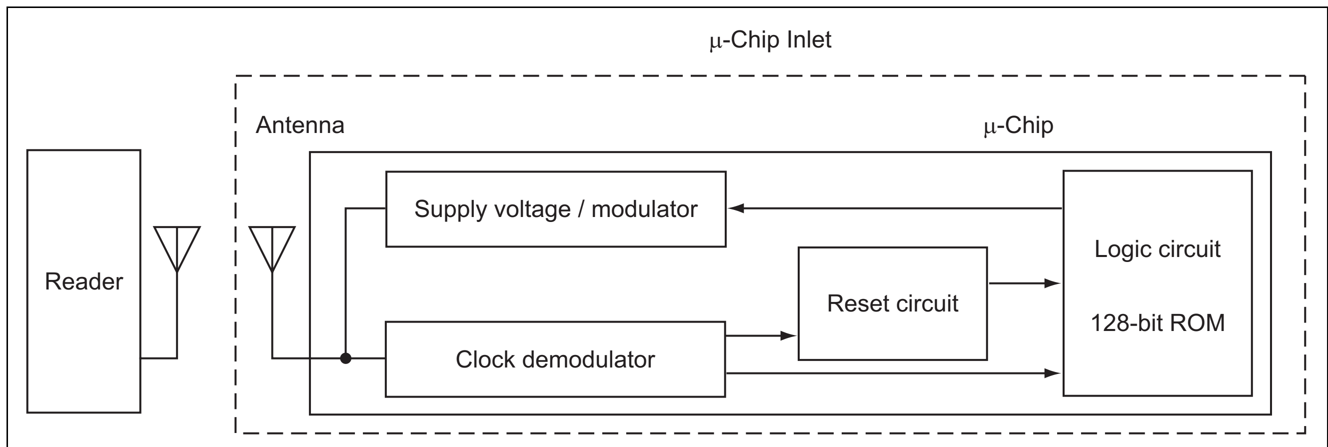
Electrical characteristics: AQL = 4.0%

Appearance: AQL = 4.0%

Precautions on Usage

1. Renesas Technology does not guarantee the product characteristics after it has been through assembly on the customer side.
2. Please refer to the mounting manual. (Document No.: REJ11P0006-0101)
3. As for this product, the electrostatic destruction prevention measures are not done because of the communication characteristic priority. Therefore, the electrostatic destruction voltage is about 50 V in machine model (EIAJ), and the static electricity level management in the process until a metallic antenna connecting is especially necessary.

System Outline



Function Blocks

Block Name	Description of Functions
Supply voltage/modulator	Generates power-supply voltage from carrier signals, varies the output impedance of the modulator circuit to match the input impedance of the antenna, and handles communications. The IC incorporates a power limiter for the protection of internal devices.
Reset circuit	Determines whether or not a clock signal is being supplied and cancels the reset mode in synchronization with the first clock cycle.
Clock demodulator	Demodulates the clock signal from the envelope signal of the received signal.
Logic circuit	The IC includes an on-chip 128-bit ROM from which data signals are sent out in synchronization with the clock signal.

Precautions for Storage, Transportation and Measuring

Note: These notes indicate a general item.
Please give priority to the notation in each C.S with Various kinds of notes originating in a product.

1. Other Precaution Involve Problems Occurring During Storage, Transportation and Measurement.

Although the general precautions for storage and transportation of electronic components can be applied as they are to semiconductor devices, the latter require certain special precautions in addition to these. The following account includes the general precautions.

1.1 Storage of Semiconductor Devices

The following methods of storage are advisable for semiconductor devices. If the precautions are not observed, faults in electrical characteristics, solderability, external appearance and other attributes may occur. In some cases, failure may also result. Precautions for storage are as follows,

(1) The storage location should be kept within the optimum ranges of temperature and humidity: 5 to 35°C and 45 to 75% R.H. are the optimal conditions.
(2) The atmosphere in the storage location should not contain any noxious gases, and the amount of dust should be minimal.
(3) Storage containers should not be susceptible to static electricity.
(4) Semiconductor devices should not be subjected to loads.
(5) When strong for long periods, store in the non-processed state. When leads have already been formed, corrosion at their bent portion of leads may occur.
(6) Be sure that sudden temperature changes sufficient to cause condensation do not occur during storage of the devices.

1.2 Precautions for Transportation

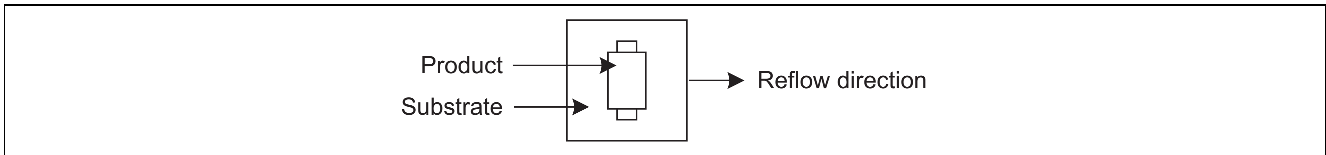
When transporting semiconductor devices or their assembly units or subsystems, the same precautions as for other electronic components should be taken. The items listed in 1.1 and 1.2 have to be followed.

(1) Transportation containers, jigs etc., should not pick up static charge due to vibration en route.
(2) Persons handling semiconductor devices should be grounded via a high resistance to discharge any static electricity that may be adhering to their clothing. The resistance value should be around 1 MΩ¶ and no other person should come between the person being discharged and ground (GND).
(3) When transporting semiconductor devices and PCBs, try to keep mechanical vibration and shocks to an absolute minimum.

2. Soldering

2.1 SMD Diodes are Formed in Consideration of PCB Mount Ability, and can be Mounted without Modification.

(1) When mounting on PCB, adhesive is used to temporarily hold diodes in place before solder is applied. When as SMD diodes is held by adhesive, be sure that it is not subjected to undue stress.
(2) Using a mounter to fix SMD diodes to a PCB can result in bending of the leads, and diode package destroy, so make sure that a force of no more than 3 N is applied and also required to not apply any force on the leads as being mounted, especially for flat package.
(3) When mounting diodes to circuit board, so make sure that flatten on the PCB. (Not becoming rough by wiring under diode body.)
(4) Please superfluous power does not join a product by the curvature of a circuit board or bending by circuit board bread etc.
(5) Since SMD diodes come in small package, be aware of thermal stress from soldering as small as possible. Keep to the following conditions.
 — When flow soldering: 260°C max. for 10 s
 — When using a soldering iron: 350°C max. for 3 s
(6) The material of lead is exposed for cutting plane. Therefore, soldering nature of lead tip part is considered as unquestioned. Please kindly consider soldering nature.
(7) When the SMD is mounted through reflow soldering, avoid incorrect positioning and floating-type failures due to bad mounting balance by taking care on the following points.
 — The left and right land patterns must have the same shape.
 — The left and right land areas, including the wiring sections, must take up the same area and include the same amount of solder.
 — The land position should become symmetrical.
 — Heat must be applied to both soldering sections at the same time (the direction shown in follow is recommended).



Soldering Conditions Using Reflow Soldering Method

Lead plating	Sn-Pb / Au / Sn-Bi
Solder paste	Sn-Pb eutectic / Sn-Ag system
Package surface temperature (Upper limit)	Peak temperature: 260°C 220°C or greater for 60 s or less
Temperature profile	Package surface temperature; Time; (1) 110 ± 30 s (2) 160°C (3) 190°C (4) 1 to 4°C/s (5) 220°C 60 s Max (6) 255°C 16 s Max (7) 260°C Max; Reflow cycle: 2 times max.

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3. Cleaning

3.1 Fading of the Marking and Color Codes

Clearness of marking and color-fastness of color codes may be lost due to cleaning.

Be sure to check these after using cleaning agents.

3.2 Electrical and Mechanical Characteristics (Discoloration, Deformation, Denaturation, etc.)

After cleaning a PCB, some corrosive material contained in the cleaning agent or flux may remain on semiconductor devices, causing corrosion of device wiring and leads with resulting loss of reliability.

Thorough cleaning is therefore required for PCBs. It is recommended that level of purity of the PCB after cleaning should conform with the MIL standard below.

PCB Level of Purity after Cleaning

Item	Standard
Remaining Cl volume	$\leq 1\ \mu g/cm^2$
Resistance of solvent (after extraction)	$\geq 2 \times 10^6\ \Omega.cm$

Notes: 1. PCB surface area: Both sides of the PCB + mounted components.
2. Extract solvent: Isopropyl alcohol (75 vol%) + H_2O (25 vol%)
(Resistance of solvent before extraction is $\geq 6 \times 10^6\ \Omega.cm$)
3. Extraction method: Clean both sides of PCB with 10 ml / $2.54 \times 2.54\ cm^2$ (minimum of 1 min.)
4. Measuring extracted solvent resistance: Conductivity meter

See MIL-P-28809A for details of the MIL standard.

3.3 Ultrasonic Cleaning

It should be avoid resonation of the devices to prevent the device being destroyed.

- SMD
  Frequency: 28 to 29 kHz (device should not be resonated)
  Ultrasonic power output: 15 W/1 (1 time)
  Time: Up to 30 s
  Others: Make sure that neither devices not PCB come into contact with the vibration source.

Note: To ensure prompt handling of customer queries, the following information should be provided concerning the diode product used;
(1) Product Name (INT.C)
(2) Lot No. (LOT)
(3) Weekly Code (W/C)
Items (1), (2) and (3) above are printed on the label attached to the packing case, reel, etc.

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